

Removing Mid-Spatial Frequency (MSF) Errors Using Stress-Polishing

Completed Technology Project (2012 - 2013)



Project Introduction

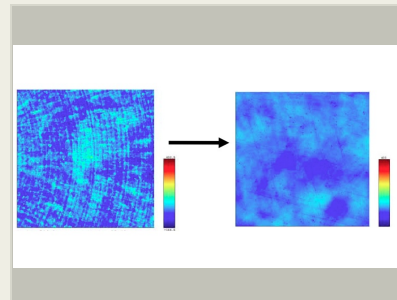
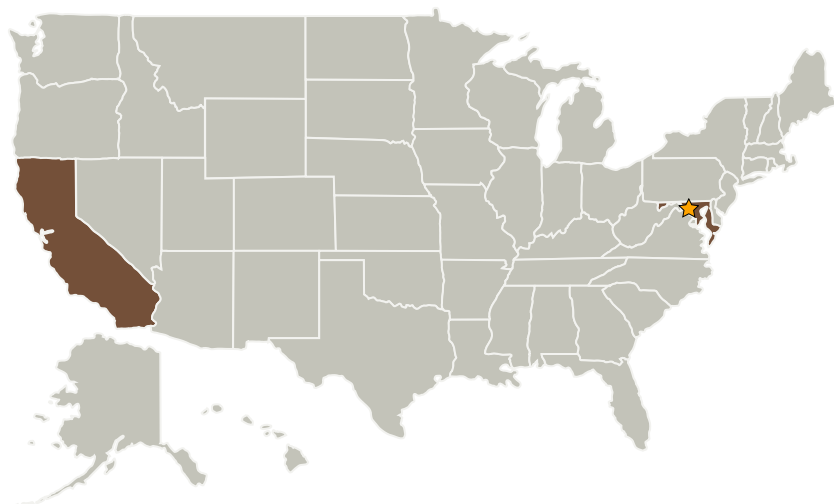
After diamond-turning aluminum aspheric mirrors, we will develop a stressed polishing process to improve surface figure and finish.

This IRAD proposes to evaluate how stress polishing can be used to extend the application of super-polishing to fast aspheres and freeforms, removing sub-aperture MSF errors, such as tool marks, from diamond-turned aluminum optics. It will leverage an old technique for manufacturing aspheres—stress polishing with a large tool. The aspheric surface will be generated using small tool manufacturing techniques. After the asphere is generated, a mechanical load will be placed onto the optic to deform the asphere into a sphere, using an interferometer to fine tune the deformation. After the asphere is deformed into a sphere, the sub-aperture tool marks can be removed by post-polishing using the Goddard super-polishing process, a process limited to spheres and flats due to the fact that it requires the use of a tight fitting large polishing tool.

Anticipated Benefits

N/A

Primary U.S. Work Locations and Key Partners

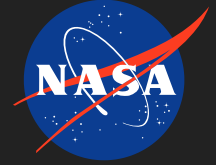


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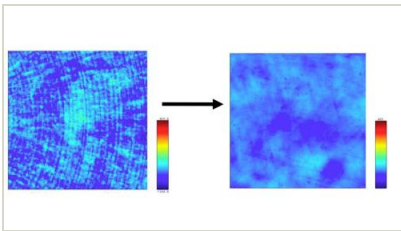


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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
University of California-Berkeley(Berkeley)	Supporting Organization	Academia	Berkeley, California

Primary U.S. Work Locations	
California	Maryland

Images

**11797-1384963914013.jpg**

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 (<https://techport.nasa.gov/image/2383>)

Links

NTR 1
 (no url provided)

Project Website:

<http://aetd.gsfc.nasa.gov/>

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Center Independent Research & Development: GSFC IRAD

Project Management

Program Manager:

Peter M Hughes

Project Manager:

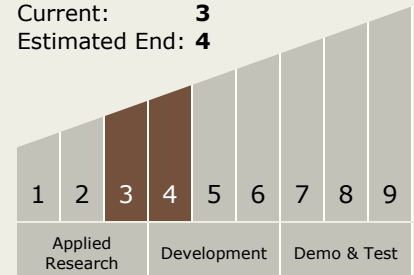
Terence A Doiron

Principal Investigator:

Peter N Blake

Technology Maturity (TRL)

Start: **3**
 Current: **3**
 Estimated End: **4**



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.4 Manufacturing
 - └ TX12.4.3 Electronics and Optics Manufacturing Process